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User Manual

Reflow Batch Oven Model: X-REFLOW305

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1. Introduction

Congratulations on your purchase of Batch Reflow Oven Model X-REFLOW305. X-REFLOW305 is a uniquely designed full convection Reflow Batch Oven for use in low volume production such as simulation of a mass-production Reflow Oven, heat resistance test of components and laboratory experiments where precise and accurate heating is required. The unit has several unique features, which enhance operation. Full convection heating with independent control of front and rear heaters, which enable hot air temperature and time setting in 4 steps and free setting of various profiles for various PCBs. A large inspection window allows monitoring during operation also applicable with a microscope. The built-in computer uses closed-loop monitoring to ensure absolute repeatability of the temperature profiles and has the memory to store 255 profiles allowing very quick profile changes perfect for low volume assembly. The large backlight display shows either the specific temperatures or time digitally or graphically. A Nitrogen Gas inlet is standard.



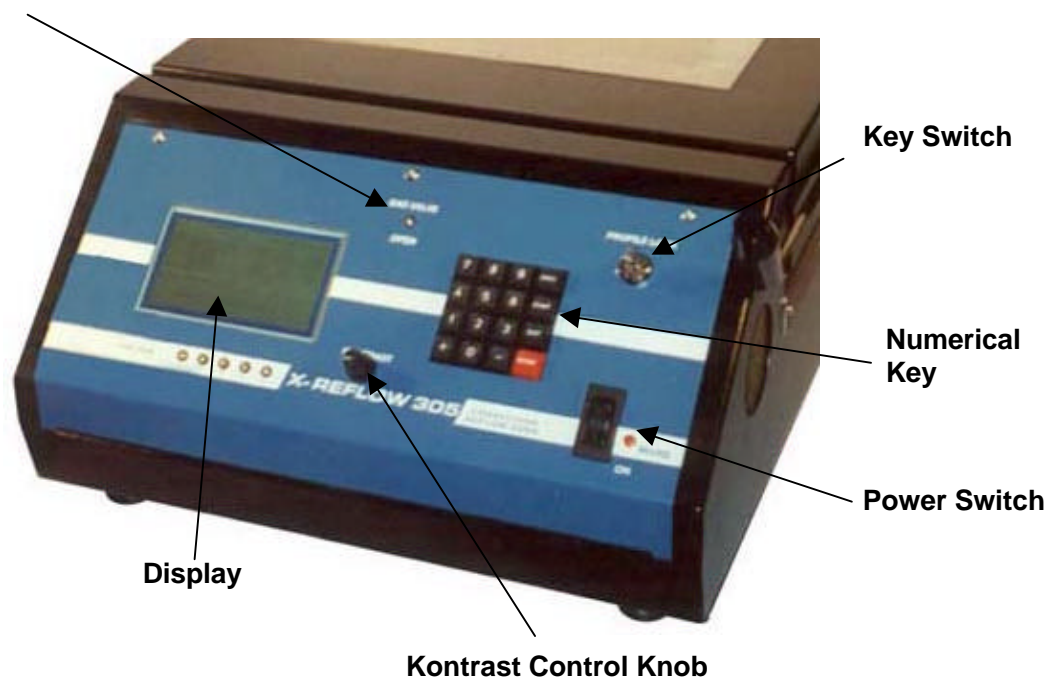
X-REFLOW305 View of the system

2. Specifications

X-REFLOW305 Specifications

Temperature Profile	4 Steps (Temperature & Time)
Cooling Cycle	1 Step (Temperature only)
Monitoring Window Size	280.280.
Maximum P.C.B. Size	305.305.40.
Nitrogen Gas Connector	Standard supply
Profile Memory Capacity	255 profiles
Temperature Control Range	150.350.(At Center air over the mesh)
Input Voltage	220.240VAC 50Hz or 60Hz. Single phase
Heater Capacity	4.8KW(2.4KW.2)
Power Cord	3m(without plug)
External Size/Dimensions	510.780.270.
Weight	35.

Gas Valve LED



X-REFLOW305 Front Panel View

3. Safety

- The fumes emitted during soldering are irritants and therefore should be removed. A pumped vent is located at the rear of the unit and should be ducted accordingly.
- Area close to the hood becomes hot, therefore care should be taken when working around this area.
- This oven must be properly grounded.
- Please read this operation manual carefully prior to use.
- Area around the viewing window becomes hot, therefore care should be taken when working around this area.
- After ending the cooling cycle, the inside of oven is still hot, therefore care should be taken when removing and mounting the PCB.
- Be sure to wear the cotton gloves to prevent burns when taking out the PCB from the oven and placing a new one. The PCB is still hot.

4. Unpacking and Set-Up

1 Connecting to the Power Supply

X-REFLOW305 must be connected to 50/60Hz. 220-240V single-phase 16A power supply.

2 Operating Frequency

X-REFLOW305 has a changeover switch for 50Hz or 60Hz on the rear panel of the unit, please set it to match your frequency. As the timing is dependent upon the operating frequency, failure to set it on the correct value will result in timing errors during the oven's cycle. When the oven is first turned ON, the computer samples the link and the set operating frequency displayed on LCD panel. Be sure to check that it shows the correct frequency.

Circuit Breaker

There is a circuit breaker on the left-hand side of the rear panel, please turn it ON prior to the operation.

3 Power Switch

There is a power switch on the front panel, please turn ON after turning ON the circuit breaker.

4 Security Key Switch

A key switch is provided to prevent unauthorized access to the profile parameters and the profile storage memory. The key must be in place and turned in the clockwise direction "ON" before starting the oven or changing a profile. The key can only be removed in the "OFF" position. Two keys are provided. One key is a spare, please keep it in a safe place.

5 Display Contrast

The display contrast is adjusted by turning the round knob next to the display.

6 Nitrogen connection & Operation Procedure (Please refer to Illus. 1)

- I. Attach the Nitrogen source($0.5 \text{ l} / \text{s}$) to the Nitrogen input port on the rear panel of the oven.
- II. Be sure that Nitrogen switch is set in the up position on the rear panel of the oven.
- III. Start the temperature profile running and the Nitrogen valve within the oven can be heard to activate and Nitrogen is then released into the oven heating area. The LED (GAS VALVE) on the front panel should light.

Note: The nitrogen valve will open at the beginning of the profile (Preheat 1). To allow enough time to purge the oven, Preheat 1 should be set for 3 to 4 minutes.

- IV. Once the temperature profile has completed its running cycle the Nitrogen valve will turn off automatically and the front panel LED (GAS VALVE) will go off.

Note: Nitrogen will not enter the heating area with the Nitrogen changeover switch (Nitrogen/Air) in the down (Air) position.

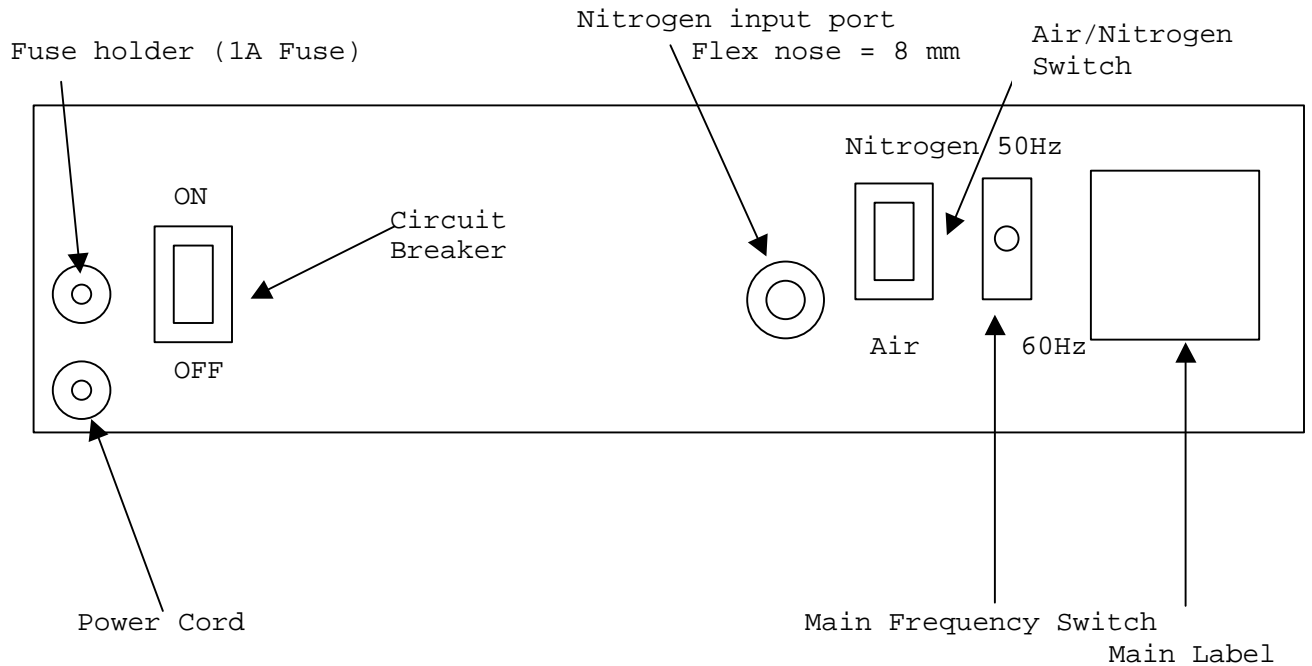


Illustration 1 X-REFLOW305 Rear Panel View

5. Panel view with Power “ON”

CONVECTION BATCH OVEN			
			PROFILE NO: XXX
SET TEMPERATURES	FRONT	REAR	TIME
PRE-HEAT 1	XXX	XXX	XXXX
PRE-HEAT 2	XXX	XXX	XXXX
PRE-HEAT 3	XXX	XXX	XXXX
REFLOW	XXX	XXX	XXXX
COOLING	XXX		
TARGET			
ACTUAL TEMPERATURE	XXX	XXX	
SECURITY SWITCH NOT ENABLED!			

The above display is shown if the oven is switched ON without the security key in place. If the key is turned ON or is already ON the display will be shown as:

CONVECTION BATCH OVEN			
			PROFILE NO: NEW
SET TEMPERATURES	FRONT	REAR	TIME
PRE-HEAT 1	150	150	0000
PRE-HEAT 2	150	150	0000
PRE-HEAT 3	150	150	0000
REFLOW	150	150	0000
COOLING	100		
TARGET			
ACTUAL TEMPERATURE	OFF	OFF	
TAIYO ELECTRIC BATCH OVEN			
*50Hz VERSION			
HIGH TEMPERATURE OVEN			
PRESS ANY KEY TO START			

* It will display 60Hz if the changeover switch set on 60Hz.

6. Entering Temperature profile.

In the opening display press any key. The user prompt dialog box changes to:

PRESS “+” KEY FOR STORED PROFILE
PRESS “-” KEY FOR NEW PROFILE

Pressing the “+”key enters the procedure for loading a profile from the computer’ memory (Please refer to Page 10. Running a pre-installed profile).

Pressing the “-” key allows new profile parameters to be entered using the numeric keys.

1 Entering New Temperature profile.

When the “-“key is pressed, the display changes to:

CONVECTION BATCH OVEN				PROFILE NO: NEW
SET TEMPERATURES	FRONT	REAR	TIME	
PRE-HEAT 1	#50	150	0000	
PRE-HEAT 2	150	150	0000	
PRE-HEAT 3	150	150	0000	
REFLOW	150	150	0000	
COOLING	150			
TARGET				
ACTUAL TEMPERATURE	OFF	OFF		
ENTER SET TEMPERATURES AND ZONE TIMES				
TEMPERATURES MAXIMUM 350 MINIMUM 150				
ZONE TIMES MAXIMUM 9999 MINIMUM 0000				
"ENTER" SAVE VALUE "CANCEL" LAST VALUE				

With the cursor flashing at the position “#”, pressing the ‘CANCEL’ key at this point returns to the previous user dialog box.

PRESS “+” KEY FOR STORED PROFILE
PRESS “-” KEY FOR NEW PROFILE

IF the “ENTER” key is pressed, the value currently displayed at the cursor position is saved (The set value of the front heater is saved) and the cursor moves to the rear heater setting.

Note: If the “CANCEL” Key is now pressed, the cursor moves to the front heater setting.

Entering the 3 digit temperature setting value, the display shows the rear heater setting and the same value is displayed. If the same value is required for both the front and rear, pressing the ‘ENTER’ key will set the rear heater to the same set value as the front heater. If the rear heater needs to be set at a different value from front heater, enter the value using the numeric keys. When both heater values have been entered the cursor is positioned at the ‘TIME’ zone value. Enter the desired time using the numeric keys. (Unit of TIME is seconds) Pressing the enter key results in the present displayed time value being saved. A numeric input will change the time value set. Pressing the ‘CANCEL’ key will move the cursor to the previous setting if an error occurs.

This process is repeated for all 4 heating zones. The 'CANCEL' key is used to go back to a previous zone if an error is made and re-enter the correct value.

The time zone LED will flash at the bottom of the Panel and showing the zone you are in while inputting the set values. The LED flashing moves in the following order.

- 1 PRE-HEAT1
- 2 PRE-HEAT2
- 3 PRE-HEAT3
- 4 REFLOW
- 5 COOLING TARGET

TIME ZONE					
	1	2	3	4	5

The cursor is then positioned at the "cooling target" temperature (Cooling Cycle). This value is the temperature that the oven must fall to before the profile is finished.

When the cooling target (cooling cycle) is entered, the user dialog box changes:

STORE NEW PROFILE
ENTER PROFILE NUMBER 001-255
PRESS "CANCEL" KEY TO EXIT

The cursor is flashing in the profile number dialog box at the "#" position.

CONVECTION BATCH OVEN
PROFILE NO. #EW

If the 'CANCEL' key is pressed, the profile is not saved in the computer memory and the oven will be ready to run. By pressing 'START' key, the oven starts the heating.

If wanting to save the profile in the computer memory, a 3-digit number must be inputted.

If the number entered is already used for a profile stored, the user dialog box changes to:

PROFILE STORE LOCATION IN USE
PRESS "EDIT" KEY TO OVERWRITE
PRESS "CANCEL" KEY TO EXIT

Pressing the "EDIT" key replaces the stored profile with the profile that has just been created.

If the "CANCEL" key is pressed, the user dialog box returns to the previous display where the new profile number can be entered.

When the profile has been successfully stored the user dialog box changes to:

PROFILE STORED
PRESS ANY KEY

When pressing any key, the oven is ready to run and the user dialog box on page 13.7. is shown.

2 Running a pre-installed profile.

PRESS "+" KEY FOR STORED PROFILE
PRESS "-" KEY FOR NEW PROFILE

In the user dialog box shown above, pressing the "+" key will change the user dialog box to the following:

VIEWING PROFILE STORE
ENTER PROFILE NUMBER 001-255
"+" NEXT PROFILE "-" PREVIOUS PROFILE
"EDIT" LOAD PROFILE "CANCEL" EXIT

Pressing the 'CANCEL' key returns to the previous user dialog box. If the "+" key is pressed, the main display shows the stored profile as Memory No.1. If the "+" key is pressed, the display shows the next profile and this is repeated with a short delay in between profiles.

Any unused Memory number is skipped. This continues until the last profile memory is reached; at this point a buzzer sounds to indicate the last profile.

The '-' key is used the same way, but this time the profile memory is displayed in the reverse order with the buzzer sounding when the newest profile is reached.

There is no cursor, but when a valid profile memory number is entered, the profile can be called up. If valid profile is displayed, pressing the 'EDIT' key loads that profile into the running profile memory and the oven is ready to run as explained on page 13 7. .

Note: 5 profiles are pre-stored prior to initial operation at profile No.001 to 005. If they are not needed, you may over write.

If no profile is stored in the memory, the profile parameter display as shown below:

CONVECTION BATCH OVEN			PROFILE NO: ###
SET TEMPERATURES	FRONT	REAR	TIME
PRE-HEAT 1	NIU	NIU	NIU
PRE-HEAT 2	NIU	NIU	NIU
PRE-HEAT 3	NIU	NIU	NIU
REFLOW	NIU	NIU	NIU
COOLING	NIU		NIU
TARGET			
ACTUAL TEMPERATURE	OFF	OFF	
VIEWING PROFILE STORE			
ENTER PROFILE NUMBER 001-255			
"+" NEXT PROFILE "-" PREVIOUS PROFILE			
"EDIT" LOAD PROFILE "CANCEL" EXIT			

If the 'CANCEL' key is pressed twice, user dialog box shows the following and pushing either "+" or "-" key returns to the previous profile.

PRESS "+" KEY FOR STORED PROFILE
PRESS "-" KEY FOR NEW PROFILE

7. Running a Temperature profile.

- 1 When either a new or stored profile has been loaded the user dialog box changes to:

PRESS "START" KEY TO START OVEN
PRESS "CANCEL" KEY TO EXIT

- 2 At this point the actual temperature in the center over the mesh (compensate the measured value at hot air outlet temperature) is displayed. If the temperature is lower than 123 , the display shows 'LOW'. If the temperature is higher than 376 , the display shows 'HOT'.

Pressing the 'START' key starts the oven with the user dialog box changing to:

PRESS "CANCEL" KEY TO STOP OVEN
PRESS "+" KEY FOR GRAPHIC DISPLAY
PRESS "-" KEY FOR TEXT DISPLAY

The oven is now operating following the profile. The time display will decrease until it reaches "0000", then the next zone is starts to run. The cursor flashes to indicate the present zone and the zone LED lights. Flashing of cursor and light of LED are continuous until the reflow zone timer decreases to "0000" and the oven enters its cooling cycle.

When the profile is over, the graphic display disappears and only a numeric mode is shown. The graphic display is automatically reduced even if the cycle time is extended to show the full scale.

8. Cooling Cycle

- 1 When the profile is completed (4 steps) or cancelled, the cooling cycle is entered and user dialog box changes to:

OVEN COOLING PRESS "CANCEL" KEY TO EXIT

The oven will now wait until both heater temperatures are below the cooling target temperature or the "CANCEL" key is pressed. The display then flashes and the buzzer sounds to indicate that the profile is completed.

Pressing any key at this point change user dialog box to:

PRESS "+" KEY FOR NEW PROFILE PRESS "-" KEY FOR SAME PROFILE

- I. If the "-" key is pressed, the user dialog box changes to:

PRESS "START" KEY TO START OVEN PRESS "CANCEL" KEY TO EXIT

In the above display if pressing the "START" key, the oven is now ready to repeat the profile. If the "CANCEL" key is pressed, user dialog box changes to:

PRESS "+" KEY FOR STORED PROFILE PRESS "-" KEY FOR NEW PROFILE.

- II. If the "+" key is pressed, the dialog box returns to:

PRESS "+" KEY FOR STORED PROFILE PRESS "-" KEY FOR NEW PROFILE.

If the "+" Key is pressed, stored profile will be ready to run and if the "-" key is pressed, it will be ready to create a new profile.

Note: The security key must be switched ON to run a new profile; otherwise the "SECURITY KEY NOT PRESENT!" is displayed.

9. Open Circuit Thermocouple Detection

If either of the thermocouples is in an open circuit, the profile is cancelled and the user dialog box changes to:

THERMOCOUPLE OPEN CIRCUIT
PRESS "CANCEL" KEY

The open circuit thermocouple is identified by the "O:C" displayed in the heater actual value position. Pressing the "CANCEL" key returns to the display in 6. Entering a Temperature profile.

Contact your dealer if it is displayed.

10. WARRANTY

- One-year parts and Labor.
- MBR ELECTRONICS cannot accept responsibility for damage to the PCBs processed in the X-REFLOW305 due to incorrect setting or misuse by the operator. Read carefully prior to use.



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